

AMENDMENTS TO THE CLAIMS

Please cancel claims 2, 9 and 18 without prejudice to further prosecution in a divisional, continuation, continuation-in-part or other application. Please amend claims 1, 3-5, 8, 10-12 and 15 and add new claims 19-23 as follows:

1. (Currently Amended) A method of generating ultraviolet light, comprising the steps of:

tuning a neodymium-doped yttrium aluminum garnet crystal laser to output a first fundamental beam at approximately 946 nanometers;

doubling the frequency of the first fundamental beam to produce a second harmonic beam having a wavelength of approximately 473 nanometers;

orienting a cesium lithium borate crystal by a phase-matching angle that corresponds to a non-critical phase-matching condition;

cooling said cesium lithium borate crystal to a temperature between -10 degrees centigrade and -20 degrees centigrade; and

passing said second harmonic beam through said cesium lithium borate crystal to produce ~~producing~~ a fourth harmonic beam having a wavelength of approximately 236.5 nanometers ~~by doubling the frequency of the second harmonic beam using a first cesium lithium borate crystal oriented for non-critical phase matching.~~

2. (Canceled)

3. (Currently Amended) The method of claim 1, further comprising the step of disposing the ~~first~~ cesium lithium borate crystal in a container of dry inert gas.

4. (Currently Amended) The method of claim 1, further comprising the step of disposing the ~~first~~ cesium lithium borate crystal in a vacuum.

5. (Currently Amended) The method of claim 1, said step of passing said second harmonic beam through said cesium lithium borate crystal further comprising the step of confocal focusing of the second harmonic beam into the ~~first~~ cesium lithium borate crystal.

6. (Original) The method of claim 1, further comprising the steps of:
tuning a rare earth doped garnet laser to emit a second fundamental beam at a wavelength of approximately 1077 nanometers;
directing the second fundamental beam and the fourth harmonic beam to a second cesium lithium borate crystal; and
sum-frequency mixing the second fundamental beam and the fourth harmonic beam in the second cesium lithium borate crystal to produce an output beam at approximately 194 nanometers.
7. (Original) The method of claim 3, wherein the dry inert gas is selected from the group consisting of nitrogen, dry air, helium, neon, argon, krypton and xenon.
8. (Currently Amended) An apparatus for generating ultraviolet light, comprising:
means for tuning a neodymium-doped yttrium aluminum garnet crystal to output a first fundamental beam at approximately 946 nanometers;
a nonlinear crystal, wherein said nonlinear crystal frequency doubles means for doubling the frequency of the fundamental beam to produce a second harmonic beam having a wavelength of approximately 473 nanometers; and
a cesium lithium borate crystal oriented to a phase-matching angle that corresponds to a non-critical phase-matching condition, wherein said cesium lithium borate crystal doubles said second harmonic beam to produce means for producing a fourth harmonic beam having a wavelength of approximately 236.5 nanometers by doubling the frequency of the second harmonic beam using a first cesium lithium borate crystal oriented for non-critical phase-matching; and
means for cooling said cesium lithium borate crystal to a temperature between -10 degrees centigrade and -20 degrees centigrade.
9. (Canceled)
10. (Currently Amended) The apparatus of claim 8, further comprising means for disposing the first cesium lithium borate crystal in dry inert gas.

11. (Currently Amended) The apparatus of claim 8, further comprising means for disposing the ~~first~~ cesium lithium borate crystal in a vacuum.

12. (Currently Amended) The apparatus of claim 8, further comprising means for confocal focusing of the second harmonic beam into the ~~first~~ cesium lithium borate crystal.

13. (Original) The apparatus of claim 8, further comprising:
means for emitting a second fundamental beam at a wavelength of approximately 1077 nanometers;

means for directing the second fundamental beam and the fourth harmonic beam to a second cesium lithium borate crystal; and

means for tuning the second cesium lithium borate crystal to sum-frequency mix the second fundamental beam and the fourth harmonic beam to produce an output beam at approximately 194 nanometers.

14. (Original) The apparatus of claim 10, wherein the dry inert gas is selected from the group consisting of nitrogen, dry air, helium, neon, argon, krypton and xenon.

15. (Currently Amended) An apparatus for generating ultraviolet light, comprising:
an active laser medium comprising a garnet crystal doped with a rare earth element;

a diode pump laser for pumping the active laser medium;

a resonator for generating a fundamental beam having a wavelength of approximately 946 nanometers from the pumped active laser medium;

a periodically-poled potassium titanyl phosphate crystal for producing a second harmonic beam having a wavelength of approximately 473 nanometers; and

a cesium lithium borate crystal ~~cooled to a temperature in the range from 10° centigrade to 20° centigrade~~ and oriented for non-critical phase-matching, for producing a fourth harmonic beam having a wavelength of approximately 237 nanometers; and

means for cooling said cesium lithium borate crystal to a temperature between -10 degrees centigrade and -20 degrees centigrade.

16. (Original) The apparatus of claim 15, wherein the active laser medium comprises a neodymium-doped yttrium aluminum garnet crystal.

17. (Original) The apparatus of claim 16, wherein the neodymium-doped yttrium aluminum garnet crystal comprises a first un-doped end portion, a doped central portion and a second un-doped end portion.

18. (Canceled)

19. (New) The method of claim 1, wherein said step of orienting said cesium lithium borate crystal further comprises the step of selecting approximately 90° for said phase-matching angle.

20. (New) The method of claim 1, wherein said step of doubling the frequency of the first fundamental beam to produce the second harmonic beam further comprises the step of passing said first fundamental beam through a nonlinear crystal.

21. (New) The method of claim 20, wherein said nonlinear crystal is selected from the group consisting of periodically-poled potassium titanyl phosphate, BBO and LBO.

22. (New) The method of claim 20, wherein said step of passing said first fundamental beam through the nonlinear crystal further comprises the step of confocally focusing the first fundamental beam into the nonlinear crystal.

23. (New) The apparatus of claim 8, wherein said phase-matching angle is approximately 90° .